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審査請求 未請求 (全1頁)

⑩ 考案の名称 分散型ELマトリクス表示素子

⑪ 実 願 昭62-129792

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⑯ 実用新案登録請求の範囲

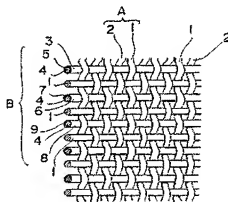
透光性線材に透明導電材料を被覆した透明導電線と絶縁線とを交互に平行配設して縦糸を形成し、導電性線材に異なる発光色を呈する蛍光体層を各々被覆した複数の蛍光体線と絶縁線とを交互に平行配設して緯糸を形成し、前記縦糸と横糸により織物を構成することを特徴とする分散型ELマトリクス表示素子。

図面の簡単な説明

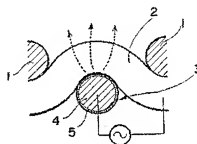
第1図は本考案の一実施例を示す斜視図、第2図は要部の断面図である。

1……絶縁線、2……透明導電線、3……赤色蛍光体線、4……銅線(導電性線材)、5、7、9……蛍光体層、6……棕色蛍光体線、8……青色蛍光体線、A……縦糸、B……横糸。

第1図



第2図



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(54) Title of the invention

Dispersive Type EL Matrix Display Element

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Description

1. Title of the invention

Dispersive Type EL Matrix Display Element

2. Scope of claims for utility model registration

A dispersive type EL matrix display element characterized in that a transparent conductive wire in which a translucent wire is covered by a transparent conductive material and an insulating wire are alternately arranged in parallel to form the warp,

and a plurality of fluorescent wires in which conductive wires are covered by fluorescent layers emitting different luminescent colors and a plurality of insulating wires are alternately arranged in parallel to form the weft, and a textile is constituted by the warp and the weft.

3. Detailed description of the invention

[Object of the invention]

(Field of industrial application)

The present invention relates to a dispersive type EL matrix display element in which light-emitting points are arranged in the form of a matrix.

(Prior art)

Generally, a dispersive type EL matrix display element is provided with a group of back electrodes which are back electrodes arranged in parallel in the form of a belt over one surface of a luminescent layer, and is provided with a group of transparent electrodes which are transparent electrodes arranged in parallel in the form of a belt in a direction orthogonal to the group of back electrodes over the other surface. When an appropriate AC voltage is applied to one of the group of back electrodes and to one of the group of transparent electrodes, a luminescent layer at a position where both the electrodes intersect each other can emit light, and this is a pixel, which is the minimum display unit of a display surface. Such an EL display element is used as a flat-panel display element, whereas a display which can perform coloring of various kinds of colors, that is, a full-color display has been required.

(Problems to be solved by the invention)

The full-color display means to perform coloring of various kinds of colors on one sheet of EL display element. Generally, an EL display element has its own luminescent color according to the composition of a luminescent layer. Thus, to enable a full-color display, a luminescent pixel pattern must be made small to selectively display red, green, blue, which are the three primary colors of light, on one pixel. However, since a dispersive type EL display element is formed by the spray method or by the printing method, there is a problem in that the size of the pixel is restricted to some extent, and the pixel pattern cannot be made so small as not to cause any trouble for visual confirmation. To realize this miniaturization, there is an EL display element wherein one set of two conductive wires having a very small diameter coated by an EL material is used as the warp, and one set of two conductive wires covered by an EL material or an insulated

material is used as the weft, and a textile is constituted by the warp and the weft, as disclosed, for example, in Examined Patent Publication No. 50-21836, but light-emitting points cannot be displayed by various kinds of colors.

The present invention has been worked out on the basis of the above problem, and the purpose of the present invention is to provide a dispersive type EL matrix display element which can make a luminescent pixel pattern small and can make an excellent full-color display possible.

[Constitution of the invention]

(Means for solving the problem)

The present invention is such that a transparent conductive wire in which a translucent wire is covered by a transparent conductive material and an insulating wire are alternately arranged in parallel to form the warp, and a plurality of fluorescent wires in which conductive wires are covered by fluorescent layers emitting different luminescent colors and a plurality of insulating wires are alternately arranged in parallel to form the weft, and a textile is constituted by the warp and the weft.

(Operation)

An intersection point where the transparent wire and the fluorescent wire intersect each other becomes a light-emitting point, and various kinds of colors can be emitted in one luminescent pixel by selecting the fluorescent wire which emits light in an arbitrary color, independently or by a combination thereof, and a luminescent pixel pattern can be made small using a wire having a very small diameter.

(Embodiments)

Described hereinafter are details of one embodiment of the present invention based on drawings. 1 is an insulating wire using a transparent Teflon wire of about 0.1 mm in diameter. 2 is a transparent conductive wire which becomes a transparent electrode, wherein a transparent conductive material such as ITO is so formed as to have a thickness of about 2000 Å around a transparent Teflon wire of about 0.1 mm in diameter by the ion plating method. The insulating wire 1 and the transparent conductive wire 2 are alternately arranged in parallel to form a warp A.

3 is a red fluorescent wire in which a fluorescent layer 5 using fluorescent powder of (Zn, Cd) S: Ag is so formed as to have a thickness of 1 μm by the spray method so that

a red luminescent color is emitted around a copper wire 4 of about 0.1 mm in diameter.

6 is a green fluorescent wire in which a fluorescent layer 7 using fluorescent powder of (Zn, Cd) S: Cu, Cl is so formed as to have a thickness of 1 μm so that a green luminescent color is emitted around a copper wire 4.

8 is a blue fluorescent wire in which a fluorescent layer 9 using fluorescent powder of ZnS: Cu, Cl is so formed as to have a thickness of 1 μm so that a blue luminescent color is emitted around a copper wire 4. The red fluorescent wire 3, green fluorescent wire 6 and blue fluorescent wire 8, using the copper wire 4 as back electrodes, interpose an insulating wire 1 between the transparent conductive wires and are successively arranged in parallel to form a weft B. The warp A and weft B are woven in a net-like form so that the transparent conductive wire 2 is placed above the fluorescent wires 3, 6, 8, and the insulating wire of the warp A is placed under the fluorescent wires 3, 6 and 8, and the part where the transparent conductive wire 2 and the fluorescent wires 3, 6, 8 intersect each other, that is, the intersection point becomes a light-emitting point arranged in the form of a matrix. One luminescent pixel pattern is constituted at three light-emitting points composed of a red fluorescent wire 3, a green fluorescent wire 6 and a blue fluorescent wire 8 adjacent to one transparent conductive wire 2, and these fluorescent wires 3, 6, 8 are selected independently or by a combination thereof to make a full-color display.

The present invention constituted in such a way as described above is such that the fluorescent wires 3, 6, 8 having conductivity and emitting luminescent lights of red, green and blue are used as the weft B, the transparent conductive wire 2 is used as the warp A, the insulating wire 1 is interposed between the transparent conductive wires, and the warp and weft are woven in a net-like form, and an arbitrary point is made to emit light in an arbitrary color by selectively applying a voltage between the fluorescent wires 3, 6, 8 and the transparent conductive wires 2. In this case, when an arbitrary luminescent pixel is selected and when, for example, the red fluorescent wire 3 is independently selected to make this luminescent pixel emit light in red, and a voltage is applied between this red fluorescent wire 3 and the transparent conductive wire 2, a fluorescent layer 5 at the intersection point where these wires intersect each other emits light in red, and the red light can be seen through the transparent conductive wire 2 above the fluorescent layer 5. When a combination of one or more arbitrary fluorescent wires 3, 6, 8 is selected, a full-color display in which a luminescent pixel is

made to emit light in an arbitrary color can be obtained.

In this way, in a dispersive type EL display element, a luminescent pixel pattern can be made small by using a wire having a very small diameter to form a textile and constitute an EL display element, and an excellent full color display is made possible. The driving method is simple and easy since the transparent conductive wire 2 as the warp A and the fluorescent wires 3, 6, 8 as the weft B are selected, and the intersection point where these wires intersect each other is made to emit light. Furthermore, since the insulating wire 1 is interposed between each transparent conductive wire 2 and each fluorescent wire 3, 6 or 9, there is no risk of a short circuit due to weaving of the warp and weft.

One embodiment of the present invention is described above, but it can be transformed as required within a range of the purport of the present invention. For example, a wire whose section is round is used as the insulating wire 1 and the copper wire 4 in said embodiment, but a sheet-shaped wire whose section is rectangular may be used. In said embodiment, fluorescent layers 5, 7, 9 of red, green and blue are formed in the copper wire 4 to make an arbitrary color-change display possible, but the colors of the fluorescent layers are not limited to these colors, and if the number of fluorescent wires is two or more, various kinds of color-change displays become possible. Furthermore, the warp A and the weft B may be reversed.

[Advantageous effect of the invention]

According to the present invention, it is possible to provide a dispersive type EL matrix display element, wherein a transparent conductive wire in which a translucent wire is covered by a transparent conductive material and an insulating wire are alternately arranged in parallel to form the warp, and a plurality of fluorescent wires in which conductive wires are covered by fluorescent layers emitting different luminescent colors and a plurality of insulating wires are alternately arranged in parallel to form the weft, and a textile is constituted by the warp and the weft, and thus, an excellent full-color display is made possible.

4. Brief description of the drawings

Fig. 1 is a perspective view showing one embodiment of the present invention, and Fig. 2 is a cross-sectional view showing the essential parts.

1: Insulating wire

2: Transparent conductive wire
3: Red fluorescent wire
4: Copper wire (conductive wire)
5, 7, 9: Fluorescent layers
6: Green fluorescent wire
8: Blue fluorescent wire
A: Warp
B: Weft

Applicant for utility model registration: NIPPON SEIKI CO., LTD.
Representative: Mamoru Ushiki, Patent attorney

Fig. 1

Fig. 2